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Evolving economic growth via the human capital development paradigm: Evidence from the Francophone West-African economies

By Friday O. OVENSERI-OGBOMO [a†]
Sunday O. IGBINEDION [b]

Abstract. This research examined the impact of Human Capital Development (HCD) on economic growth among the ten French-Speaking West African Countries. In carrying out the empirical research, data were collected on human capital development and growth indices from countries in the sub region and panel data analysis was conducted. The period of analysis covered was between 1995 and 2017. Panel data analysis was used in capturing the relationship between human capital development and economic growth in the West Africa sub region. The endogeneity problem often associated with panel data analysis was accounted for through the use of the Generalized Method of Moments. From the Arellano-bond dynamic panel estimation, it revealed that secondary school levers (SSE6), those who enrolled for a minimum of four years at the tertiary school level (TSE4) and gross capital formation (GCF) were statistically significant in determining economic growth among the Francophone countries in West Africa. The Arellano-Bond dynamic panel results show the acceptance of the null hypotheses, which indicate that there is no significant relationship between economic growth and secondary school and tertiary school enrolment in Francophone West African sub region. From the result, emphasis should be devoted to vocational and functional technical education as well as Information and Communication Technology (ICT) and increase in government expenditure on health in the French-speaking West Africa sub region.

Keywords. Human capital development, ICT, Economic growth, Generalized methods of moments, Variance inflation factor.
JEL. F43, J24, O11.

1. Introduction

The desire of many Less Developed Economies (LDEs) is the advancement of their growth and development frontiers. The possibilities of this according to several endogeneous theorists is fundamentally and practically predicated on large scale investment in Human Capital Development (HCD) through the instruments of science and technology, education and health care provision. Most countries suddenly realized that human capital infrastructure remains the super

[a†] Department of Economics, Banking and Finance, Benson Idohosa University, Benin, Nigeria.
☎. 9330387824 ✉. ogbomo@biu.edu.ng
[b] Department of Economics and Statistics, University of Benin, Benin, Nigeria.
☎. 9831054204 ✉. Sunday.igbinedion@uniben.edu

structure upon which developed and modern societies are built. Therefore, the Francophone West Africa countries decided to key into this development and growth paradigm. This region also realized that most developed countries in Europe and North America as well as the Fast Emerging Economies (FEEs) of the South East Asia (SEA) and Latin America, have been able to accelerate their development and growth potentials through institutional capacity building founded on HCD.

According to Bergheim (2005), the Fast-Growth countries of Spain, Thailand, India and China (STIC) have been able to record unprecedented growth rates in their respective economies. This was due to the adequate investment these countries gave to education and health. This scenario was perhaps different from the Slow-Growth Countries (SGCs) of the Francophone West Africa. The improvement in human capital has been judged by most development economists as a critical pre-condition for a country's economic, political and socio-cultural transformation. It is on this premise therefore that human capital is considered as an engine for economic growth, agent of economic transformation and a catalyst for social renaissance (Ovenseri-Ogbomo, 2017).

The World Bank (1998) has argued that the difference between the developed countries of the World and the Sub-Sahara African countries is the human capital factor. This is so because advancement in human capital investment drives all the processes of growth. Whenever there is a disconnection between economic growth and productivity, the discounting factor could sometimes pivot around human capital (World Bank, 1998).

The objective of the paper is to empirically investigate the role of HCD on economic growth among the Francophone countries in West Africa. Following the introduction, section two reviewed the conceptual, theoretical and empirical literature. Section three discussed the the theoretical foundation of the specified model as well as the applied methodology and the empirical procedures. Sections four and five presented and discussed the empirical results and policy recommendations and conlusions repectively.

2. Conceptual and theortical literature

According to the World Bank (2005: 56), human capital development captures the investment individuals devote to themselves which ultimately translate to the enhancement of economic productivity which therefore engenders economic development and sustainable economic growth over time. Mankiw (1995: 109) defines human capital as the knowledge or skills that individuals acquire via education, from childhood programmes such as Head Start to on-the-job training for adults in the labour force. Hartog (2001: 24) refers to human capital as the knowledge, skills, competence and other characteristics encpapsulated or enshrined in people or humans which are quite germane to productive activities. In the same vein, Kruger & Kumar (2004: 16) also define human capital as the total aggregates of the capabilities, skills or dexterity of people in a given society.

According to Diejomaoh (1978: 21), human capital is the aquisition of talents and skills for efficient investment in an economy. This helps in raising the standard of living of the people and increasing the growth of an economy. He also considers human capital as one of the expensively indispensable asset that can be mobilized and developed for an economy to attain its full potentials. With this, individuals can fully participate in socio-economic transformation of a nation. The quality of human capital development available to a nation will determine the extent, rapidity or velocity of the economic growth. This is evidenced from the development strides in the East Asian Countries and BRIC countries – Brazil, Russia, India and China. The quality of human capital is equally dependent on the quality and functionality of a nation's educational system.

According to the Solow-Swan model, the output of an economy grows in response to large inputs of capital and labour (all physical inputs). Furthermore, the economy under such a model conforms to the *Law of diminishing returns to scale*. This simply means that the technological progress is *exogenous* to the system. Yet the reality is quite contrary to that, particularly for the East Asian developing economies mentioned earlier, where the economies kept growing for well over three decades. This implies that it is not only technological factors which is the main driving force and catalyst for maintaining such high growth performance in these economies, but that there are other factors which are outside the realm of neoclassical growth model.

2.1. Reviewing empirical literature

Earlier empirical researchers on the link between human capital and economic growth as espoused by Barro (1991), Mankiw, Romer & Weil (1992) were based on panel data. The cross sectional data in these studies cover one hundred countries. They measured human capital with school enrolment rates at the primary and secondary school levels. From their empirical findings, they discovered that human capital proxy by the above parameters was positively related to the growth rate of output which was captured by Gross Domestic Product (GDP). Barro (1991) reported that only the relatively poor countries with high levels of human capital formation relative to their GDP tended to catch up with the well endowed countries of the world. This was a true reflection of the Asian Tigers, India, China, Brazil and Mexico. Barro & Sala-i-Martin (1995) and Sala-i-Martin (1996) included life expectancy and infant mortality in the growth regression as a proxy for human capital development. They equally measured human capital from school input or cognitive test. From their empirical findings, they found out that life expectancy has a strong positive relationship with economic growth.

Kreuger & Lindah (1998) on their part using a cross country growth equation model showed more robust results. According to them, changes in the human capital stock with respect to higher educational attainment, coupled with technological advancement had a significant positive impact

on the growth rates of selected economies, their findings were in harmony with the model in Lucas (1998). Also, the evidence with respect to the direct impact of the level of human capital variables on growth rates is much stronger, though the magnitude of this impact is not uniform across countries. Furthermore, Kreuger and Lindah found a greater impact of secondary and higher education on growth compared with primary education which has a significant and even more positive effect of female education on output growth.

Using a cross-sectional study, Bukhari, Ali & Saddaqat (2007), examine the relationship between public sector investment in education and health and economic growth in the three Newly Industrialized Economies (NIEs) of South East Asian (SEA) countries of Singapore, Taiwan and South Korea. It was observed that public investment in education and health care services was critical and statistically significant to economic growth in that region. They concluded that consistent public investment in these sectors has the capacity to engender economic growth among the *"Little Dragons"* economies as these three countries are often called.

3. Theoretical framework and methodology

The model being considered takes its root from the neoclassical growth model. The model accentuates the fact that long term economic growth results from physical capital (K) and labour force (L). Swan (1956) and Solow (1957) were among those who first demonstrated this. The neoclassical production function exhibits constant returns to scale in labour and capital. In view of the forgoing, the Cobb-Douglas production function can be presented as follows:

$$Y_{(t)} = K_{(t)}^{\alpha} A_{(t)} L_{(t)}^{1-\alpha} \text{-------- } 0 < \alpha < 1 \quad (1)$$

Where; Y_t - Output at time (t), K_t- Capital at time (t), L_t-Lbour at time (t)A_t -The level of technology at time (t) (effectiveness of labour).

A and L are assumed to grow exogenously at rates of n and g. The growth of labour force (L) is define as n, while the efficiency of each unit of labour (A) grows at the rate of g, therefore we can defined labour force at time, t ($L_{(t)}$) and the level of technology at time, t ($A_{(t)}$) to be:

$$L_{(t)} = L_{(0)}e^{nt} \quad (2)$$
$$A_{(t)} = A_{(0)}e^{gt} \quad (3)$$

The second model of Romer (1990), takes a different approach to account for technological progress. In this model, he saw knowledge as part of the aggregate capital (k). The model assumed that technological knowledge is labour-augmented, thereby acting as a pivot to labour productivity. The production function is expressed as:

$$Y = K^{\alpha}(AL)^{1-\alpha} \quad (4)$$

Where; AL = Knowledge – adjusted workforce

Altogether, productivity is enhanced in the process. In the same vein, Lucas (1998) asserts that variation in population growth cannot account for any substantial variation in real incomes. Mankiw, Romer & Weil (1992) developed what is now popularly referred to as the augmented Solow model which this research is predicated on. Economists have pointed the overall critical importance of human capital to economic growth. Kendrick (1976) estimated that over half of the US capital stock in 1969 was human capital. The introduction of human capital accumulation to the Solow growth model gives the augmented Solow model as:

$$Y_{(t)} = K_{(t)}\alpha H_{(t)}\beta A_{(t)} L_{(t)}^{\,1-\alpha-\beta} \quad (5)$$

Where; α = Physical capital share of income, β = Human Capital share of income, H = Stock of human capital, and all other variables remain as earlier defined. If **sk** is the fraction of income invested in physical capital and **sh** is the proportion invested in human capital, the given economy is determined by

$$\dot{k}_{(t)} = sky_{(t)} - (n+g+\delta)\, k_{(t)} \quad (6)$$

$$\dot{h}_{(t)} = shy_{(t)} - (n+g+\delta)h_{(t)} \quad (7)$$

Where; y = Y/AL (ratio of per capital income to effective unit of labour), k = K/AL (ratio of physical capital to effective unit of labour), h = H/AL (ratio of human capital to effective unit of labour). There is the absence of steady state in the model. Equations above indicate that the economy converges to a steady state defined as:

$$K^{*} = \left[\frac{S_k^{\,1-\beta} S^{\beta} h}{n+g+\delta}\right] 1/1-\alpha-\beta \quad (8a)$$

$$h^{*} = \left[\frac{S_k^{\,\alpha} S_h^{\,1-\alpha}}{n+g+\delta}\right] 1/1-\alpha-\beta \quad (8b)$$

Substituting (8a) and (8b) into the production function in equation 7 and taking logs gives

$$\ln\left(\frac{Y_{(t)}}{L_{(t)}}\right) = \ln A(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha-\beta}\ln(sk) + \frac{\beta}{1-\alpha-\beta}\ln(sh) \quad (9)$$

Equation 9 implies that income per capita is a function of population growth and accumulation of physical and human capital. The augmented

Solow model is also predicated on α, which is the physical capital's share of income and β, which is the human capital's share of income.

3.1. Model specification

The model being considered is mirrored from the augmented Solow model is summarized below as

$$Y = AK^{\alpha}(hL)^{\beta} \tag{10}$$

Where; Output level (Y), Stock of physical capital (K), h = Level of human capital, Labour force (L), Efficiency of labour (A).

In a more explicit manner, equation (10) above can be presented as follows:

$$\begin{aligned} Y_{it} = {} & \phi_0 + \lambda_1 \ln(PSE6)_{it} + \lambda_2 \ln(SSE6)_{it} + \lambda_3 \ln(TSE4)_{it} + \lambda_4 \ln(EXE)_{it} \\ & + \lambda_5 \ln(LER)_{it} + \lambda_6 \ln(EXH)_{it} + \lambda_7 \ln(PGR)_{it} + \lambda_8 \ln(GCF)_{it} + \lambda_9 \ln(IUP)_{it} + U_{it} \end{aligned} \tag{11}$$

Y -Economic growth (proxied by growth rate of GDP), PSE6-Numbers of Primary School leavers after six years of Enrolment, SSE6-Numbers of Secondary School leavers after six years of Enrolment, TSE4-Numbers of students graduating from Tertiary School after four years of Enrolment, EXE-Government Expenditure in Education, LER-Life Expectancy Rate at Birth, EXH-Government Expenditure on Health, PGR-Population Growth Rate, GCF-Gross Capital Formation, IUP-Internet Users per 100 Persons proxy for Information and Communication Technology (ICT), μ_{it}-Stochastic Error Terms. The *a priori* expectations of the signs of the coefficients in the specified growth model in equation (11) are positive.

3.2. Methodology

Panel data analsis is deployed in this study. It is instructive to note that the research is highly indebted to the dynamic panel model based on the Generalized Method of Moments (GMM) developed by Arellano & Bond (1991). The associated problems of cross-sectional data analysis, such as heterogeneity, endogeneity, unit root, and co-integration are all accounted for with the use of the dynamic GMM.

3.3. Estimation techniques and procedures

This research is predicated on the panel data analysis owing to the cross-sectional dimension of the data set consisting of 10 Francophone countries in West Africa. The Fixed and Random effect models were conducted in this analysis. In this study, the choice between the fixed effects and the random effects model for the estimation will be based on the Hausman specification test. In order to test the validity of the selected instruments, we perform the Sargan test of over-identifying restrictions proposed by Sargan (1958; 1988). The Sargan test is premised on the underlying

assumption that parameters in the models are identified through *a priori* restrictions on the coefficients, and tests the authenticity or validity of over – identifying restrictions.

4. Estimation and interpretation of results

The summary or descriptive statistics for the Francophone countries within the West African sub-region is presented in Table 1 below.

Table 1. *Descriptive Statistics (1995-2016)*

Variable	Obs.	Mean	Std. Dev.
GRR	200	3.9695	3.632243
PSE6	200	73.31	26.1575
SSE6	200	25.625	19.92005
TSE4	200	4.87	5.699608
EXE	200	16.6695	4.504461
LER	200	54.45	5.894167
EXH	200	5.892	1.312765
PGR	200	2.52	0.7751803
GCF	200	19.985	5.976905
IUP	200	27.225	35.21113

Source: Authors' computation (2016)

The summary or the descriptive statistics displayed in Table 1 above, shows that the level of economic growth (indicated by the growth of the economy GRR) for the sample of the ten (10) Francophone West African countries averaged around 3.9695. The Secondary School leavers on the average (after six years of secondary school education) [SSE6] stood at about 25.63 percent of the Francophone economies in West Africa. This clearly portrayed the fact that school leavers at the secondary levels also have a low contribution to economic growth among the Francophone countries in West Africa. Government expenditure on education (EXE) averaged around 16.67 percent of growth rate over the period under review. On the basis of this, we can infer that there has been low level of government expenditure on education among the Francophone countries.

Population growth rate (PGR) for the sample of French-speaking countries in the region averaged around 2.52 percent shows that population of the West African countries is vibrant and has the tendency to contribute to economic growth rate. Gross capital formation (GCF) and information and communication technology (captured by Internet Users per 100 Persons IUP) averaged around 19.95 percent and 27.23 respectively over the period under consideration. The result shows that there is still a low level of investment in the French-speaking West African economies and also the level of information and communication technology is quite critical to the level of growth of the Francophone economies.

Table 2. *Correlation analysis for the ten French-speaking West African countries*

	GRR	PSE6	SSE6	TSE4	EXE	LER	EXH	PGR	GCF	IUP
GRR	1.0000									
PSE6	-0.0783	1.0000								
SSE6	-0.0126	0.7494	1.0000							
TSE4	-0.0445	0.5425	0.8733	1.0000						
EXE	-0.0286	0.3138	0.0960	0.1380	1.0000					
LER	-0.0650	0.5389	0.7676	0.6608	0.0121	1.0000				
EXH	0.0189	-0.01976	-0.2699	-0.1998	0.0719	-0.3848	1.0000			
PGR	0.1221	-0.4449	-0.7308	-0.6545	-0.1824	-0.4511	0.3633	1.0000		
GCF	0.2205	-0.0230	0.1060	0.1000	0.0744	0.4865	-0.0619	0.0309	1.0000	
IUP	0.0042	0.5438	0.6346	0.7056	0.2911	0.4645	0.1053	-0.2676	0.147	1.0000

Source: Authors' computation (2016)

The table above focuses on the correlation between the dependent and the independent variables under consideration. It is seen from the result that students that have left the secondary school level of education (SSE6) after six years of secondary school education is negatively associated with economic growth in the French speaking West African countries. Population growth rate (PGR), gross capital formation (GCF) and information and communication (ICT) measured by Internet Users per 100 Persons (IUP) are all positively correlated with economic growth of the Francophone countries of the West African sub-region.

4.3. Multicollinearity (VIF) test

To check whether these variables are seriously collinear, we performed a Variance Inflation Factor (VIF) test suggested by Belsley, Kuh & Welsch (1980). The relative absence of multicollinearity is further embellished and buttressed with the result of the variance inflation factor (VIF) test, displayed below:

Table 3. *Variance Inflation Factor (VIF)*

Variable	VIF	$^1/_{VIF}$
PSE6	2.44	0.410283
SSE6	6.27	0.159442
TSE4	3.44	0.290835
EXE	1.17	0.857328
LER	4.84	0.206633
EXH	1.96	0.508909
PGR	1.47	0.680983
GCF	1.94	0.516130
IUP	2.40	0.416605
Mean VIF = 2.46		

Source: Authors' computation 2016

The mean of Variance Inflation Factor (VIF) test turns out to be substantially lower than 10, which indicates that the correlation among the variables does not pose any serious multicollinearity problem for estimation. The mean of Variance Inflation Factor (VIF) as shown above which is 2.46, reveals that there is no indication of multicollinearity since the mean is less than 10. The benchmark for the presence of multicollinearity is when the mean of VIF is more than 10.

4.4. Panel Unit Root Tests

Panel data sets are assumed originally to be non stationary hence the need to carry out a pretest to ensure that there is a stationary co integrating relationship among the variables in the process to avoid the problem of spurious regression analysis. Thus, while I(2) implies integration of order two (stationary after second differencing), the I(1) implies integration of order one (stationary after first differencing) and the I(0) implies integration of order zero (stationary at levels). Asteriou & Hall (1997) developed a procedure of combining information from the time series data with that obtained from the cross – section data. The theoretical premise of the development of the panel unit root test lies with the asymptotic behaviour of a panel ***i*** and ***t***, where ***i*** is the number of countries and ***t*** being the time period. A panel data set is seen to be balanced when it has an equal number of countries (*i*) and time observations (*t*) for every variable used in the panel data set.

In this study, four methods of analysis were applied to determine the stationarity and stability of the variables via the panel unit root tests. These include the Levin, Lin & Chu t* (LLC) method (2002); Im, Pesaran & Shin W-Stat (IPS) method (2002); Augmented Dickey-Fuller-Fisher (ADF-F) method (1979); and Philip Perron – Fisher (PP-F) method.

Table 4. *Summary of Panel Unit Root Tests*

Variables / Methods	GRR	PSE_6	SSE_6	TSE_4	EXE	EXH	LER	PGR	GCF	IUP
	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
LLC	-5.037	0.7286	6.478	6.1154	-.59297	-.2268	.28096	-8.3063	-0.4867	10.2176
	(0.000)	(0.766)	(1.00)	(1.000)	(.2766)	(.4103)	(.6106)	(.0000)	(.3132)	(1.000)
IPS	-5.684	3.9202	10.64	7.6866	.47675	-.56100	4.9903	-3.0243	.72284	12.7134
	(0.000)	(1.000)	(1.00)	(1.000)	(0.683)	(.2874)	(1.000)	(.0000)	(.7651)	(1.000)
ADF-F	87.613	21.721	5.789	7.3478	26.061	30.327	8.2297	96.709	24.5719	0.49697
	(0.000)	(0.864)	(1.00)	(1.0000	(0.672)	(.4490)	(1.000)	(.0000)	(.7456)	(1.000)
PP-F	226.20	11.751	4.797	10.193	33.154	53.388	17.197	285.758	41.6935	.02595
	(0.000)	(0.999)	(1.00)	(0.999)	(.3159)	(.0054)	(1.000)	(.0000)	(.0760)	(1.000)
	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
LLC	-9.864	-3.644	-0.547	-0.4802	-5.173	-.79779	.46046	-6.3953	-8.6388	2.19995
	(0.000)	(0.000)	(0.02)	(0.316)	(.0000)	(.2125)	(.0000)	(.0000)	(.0000)	(0.000)
IPS	-13.13	-4.696	-2.003	-3.8376	-6.8921	-7.6115	-5.6187	-6.1975	-8.6207	2.41972
	(0.000)	(0.000)	(0.01)	(.0001)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(0.000)
ADF-F	195.46	75.033	48.62	55.769	103.04	114.065	77.677	98.2435	128.215	14.3531
	(0.000)	(0.000)	(0.00)	(0.000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(0.000)
PP-F	1975.7	117.67	123.5	144.86	406.26	332.193	239.55	147.87	547.666	22.0614
	(0.000)	(0.000)	(0.00)	(0.000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(0.000)

Source: Authors' Estimation (2016).

Note: Most of the variables were found to be statistically germane or significant at 1 percent level. The probability values are reported in parenthesis below each coefficient. All the variables remain as ealier defined.

From the result displayed above, it shows that the t- statistic values found to be highly statistically germane when it is compared with the critical values for decision making in respect to the stated hypotheses as supported by the probability values reported in parentheses below each

coefficient. The results of the unit root tests conducted revealed that most of the variables were significant after first differencing I (1). From the results displayed above, only Economic Growth Rate (GRR), a proxy for economic growth and Population Growth Rate (PGR) were stationary at levels I (0), meaning integration of order zero. Information and Communication Technology (ICT) captured by Internet Users per 100 persons (IUP) became stationary after second differencing I (2), this implies integration of order two. From the t – statistic (s) and the probability values above, most of the applied variables became stationary and statistically significant at 1 percent levels. *Panel Cointegration Test:* The panel co integration test reveals a highly statistically significance and strong empirical evidence that GRR, PSE6, SSE6, TES4, EXE, EXH, LER, PGR, GCF and IUP have long run relationship. The variables used have long run equilibrium relationships and they are co itegrated. The assumption of no deterministic trend was also rejected, hence, the variables used have deterministic trend and they can be used for predicting purpose.

4.5. Panel Regression Results for the Francophone Countries in West Africa

The panel regression results for the Francophone countries are therefore presented as follows:

Table 5. *Panel Estimation Result for the Francophone Countries*

Variables	GRR (Fixed Effect)	GRR (Random Effect)
CONS	9.51569	15.3603
	(0.68) [0.497]	(2.08) [0.04]
PSE6	-0.0034	-0.032552
	(-0.09) [0.930]	(-1.81)*** [0.070]
SSE6	.25727	0.267634
	(2.74)** [0.06]	(2.65)** [0.051]
TSE4	-0.142067	-0.14791
	(1.14) [0.225]	(-1.28) [0.199]
EXE	-0.161818	-0.017012
	(1.53)*** [0.128]	(-0.25) [0.799]
LER	-0.155214	-0.118820
	(-0.48.) [0.632]	(-01.21) [0.227]
EXH	-0.35487	-0.147346
	(-0.11) [0.910]	(-0.62) [0.532]
PGR	1.878299	1.43194
	(2.74)* [0.002]	(3.36)* [0.018]
	0.124072	0.148187
GCF	(1.71)*** [0.088]	(2.59)** [0.060]
IUP	0.00933	.143129
	(0.43) [0.668]	(2.43)** [0.15]
N(n)	200 (10)	200 (10)
Prob >F	0.0000	0.00178
Hausman Test	Chi2 (8) = 80.26 [0.000]	

Source: *Authors' computation 2017*

In choosing between the fixed and the random effects, the Hausman test was conducted for the selected variables. From the result, the random effect is preferred to the fixed effect. Since the probability value (0.000) of the

Hausman test is less than or equal to 10 percent, hence, it is preferred to the random effect.

4.6. Dynamic Panel-Data Estimation Results for the Francophone countries

The results presented below show the dynamic panel estimation for the ten French speaking West African countries:

Table 6. *Arellano-Bond Dynamic Panel-Data Estimation Results for the Francophone countries in West Africa. Growth Rate (GRR) is a proxy for Economic Growth which is the dependent variable*

Variables	One-Step Results	Two-Step Results
CONS	29.71399	179.2276
	(1.54) [0.123]	(0.99) [0.291]
ΔGRR_{t-1}	-0.0704663	0.0004443
	(-0.88) [0.380]	(0.01) [0.989]
ΔPSE_{6-1}	0.0145822	0.1828692
	(0.31) [0.759]	(0.68) [0.495]
ΔSSE_{6-1}	0.2851736	9.320441
	(2.77)** [0.059]	(0.56) [0.573]
ΔTSE4-1	-0.2313724	44.98915
	(-1.60)*** [0.110]	(0.59) [0.558]
ΔEXE_{t-1}	-0.2026966	11.97471
	(-1.68)*** [0.094]	(0.42) [0.675]
ΔLER_{t-1}	-0.5760657	-29.24515
	(-1.29) [0.196]	(-0.56) [0.576]
ΔEXH_{t-1}	0.3455834	-64.99868
	(0.88) [0.377]	(-0.69) [0.493]
ΔPGR_{t-1}	0.4115053	574.3456
	(0.22) [0.824]	(0.60) [0.547]
ΔGCF_{t-1}	0.1692466	-2.199973
	(1.90)** [0.057]	(-0.45) [0.655]
ΔIUP_{t-1}	0.0233897	-3.388439
	(0.94) [0.347]	(-0.55) [0.582]
N (n)	180 (10)	180 (10)
Sargan Test	$Chi^2(10) = 11.19$ (0.0000)	$Chi^2(10) = 60.29$ (0.0000)

Source: Authors' compuation 2016

Note: Where Z-values are reported in parenthesis below each coefficient ( ) and the probability values are reported in bracket [ ]. The variables entering the Dynamic model are in first difference. The dynamic model is based on the Arellano-Bond Estimation procedure. The levels of significance are thus presented as: 5 percent level of significance (**), and 10 percent level of significance (***).

From the dynamic panel result presented above, the one-step estimator is asymptotically efficient and robust to the two-step result, hence the preference for one-step result over two-step (Greene, 2003).

5. Conclusion and recommendations

The study broadly aims at establishing an empirical relationship between human capital development and economic growth among the French-speaking region of West Africa. Economic growth in the sub region

was proxied by growth rate (GRR). Relevant data were collected from a cross-section of ten (10) Francophone countries in West Africa. From our findings, the following recommendations are hereby suggested:

Firstly, the various economies should evolve a model that will stimulate and encourage functional vocational schooling system. Other Francophone countries should take a cue from the current technical and vocational education birthed in Benin Republic. Recall that the economic rejuvenation of the South East Asian's (SEA) economies is not unconnected with cautious attention paid to vocational and technical education.

Secondly, the region should step up their total expenditure on health and education. It should be stressed that the fundamentals of re-inventing a nation's productive base is hugely premised on the quality of the nation's labour force. Also, the quality of the labour force of a nation is a function of their educational quality and health status via the vehicle of total expenditure on health and education.

Finally, the region should regoruosly pursue the Information and Communication Technology (ICT) revolution agenda that will ultimately leads to the transformation of these French-speaking economies.

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